

the cargo at the safety relief valve setting. A reduction in the required outage may be permitted by the Commandant when warranted by special design considerations. Normally then, the maximum volume to which a tank may be loaded is:

$$V_L = 0.98 d_r V / d_L$$

where:

V_L = maximum volume to which tank may be loaded.

V = volume of tank.

d_r = density of cargo at the temperature required for a cargo vapor pressure equal to the relief valve setting.

d_L = density of cargo at the loading temperature and pressure.

(b) Nonrefrigerated tanks shall be filled so that their filling densities shall not exceed the ratios indicated in Table 38.15-1(b).

(c) The "filling density" is defined as the percent ratio of the weight of the gas in a tank to the weight of water the tank will hold at 60° F.

TABLE 38.15-1(B)—MAXIMUM PERMISSIBLE FILLING DENSITIES FOR TANKS OPERATING AT OR NEAR AMBIENT TEMPERATURE

Specific gravity at 60° F.	Maximum permitted filling density		
	Unlagged tanks—water capacity		Lagged tanks—all capacities
	1,200 gal. and under	Over 1,200 gal.	
0.473-0.480	38	41	42
0.481-0.488	39	42	43
0.489-0.495	40	43	44
0.496-0.503	41	44	45
0.504-0.510	42	45	46
0.511-0.519	43	46	47
0.520-0.527	44	47	48
0.528-0.536	45	48	49
0.537-0.544	46	49	50
0.545-0.552	47	50	51
0.553-0.560	48	51	52
0.561-0.568	49	52	53
0.569-0.576	50	53	54
0.577-0.584	51	54	55
0.585-0.592	52	55	56
0.593-0.600	53	56	57
0.601-0.608	54	57	58
0.609-0.617	55	58	59
0.618-0.626	56	59	60
0.627-0.634	57	60	61

NOTE: Increase in filling densities to provide for seasonal changes may be considered by the Commandant upon presentation of factual evidence that safe operation can be effected.

§ 38.15-5 Cargo hose—TB/ALL.

(a) When the liquid and vapor line hoses used for loading and discharging

the cargo are carried on board the vessel, they shall be of flexible metal and fabricated of seamless steel pipe and flexible joints of steel or bronze, or of other suitable material resistant to the action of the cargo. Hose used in refrigerated systems shall be suitable for the minimum temperature to which it may be subjected and shall be acceptable to the Commandant.

(b) Hose subject to tank pressure, or the discharge pressure of pumps or vapor compressors, shall be designed for a bursting pressure of not less than five times the maximum safety relief valve setting of the tank, pump, or compressor.

(c) Before being placed in service each new cargo hose, with all necessary fittings attached, shall be hydrostatically tested by its manufacturer to a pressure not less than twice its maximum working pressure nor more than two-fifth its bursting pressure. The hose shall be marked with its maximum working pressure, and if used in refrigerated service, its minimum temperature.

§ 38.15-10 Leak detection systems—T/ALL.

(a) A detection system shall be permanently installed to sense cargo leaks. The detectors shall be located within the space so as to permit the sensing of an initial leak and prevent an undetected gas accumulation. The sensitivity shall be in accordance with paragraph (b) of this section. The detectors shall be fitted in the following compartments:

(1) Between the primary and secondary barriers for nonpressure vessel type tanks.

(2) Cargo handling rooms and spaces containing cargo piping or cargo handling systems.

(3) All enclosed spaces, except tanks and cofferdams, which are separated from the cargo tanks by only the secondary barrier.

(4) Other spaces where gas concentrations might be expected.

(5) Cargo holds, containing pressure vessel type tanks and no cargo piping, are exempt from the requirements of this paragraph.

(b) The indicating instruments for the detection system shall be located